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Regular nonminimal magnetic black holes in spacetimes with a cosmological constant

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Abstract

© 2016 American Physical Society.We consider new regular exact spherically symmetric solutions of a nonminimal Einstein-Yang-Mills theory with a cosmological constant and a gauge field of magnetic Wu-Yang type. The most interesting solutions found are black holes with metric and curvature invariants that are regular everywhere, i.e., regular black holes. We set up a classification of the solutions according to the number and type of horizons. The structure of these regular black holes is characterized by four specific features: a small cavity in the neighborhood of the center, a repulsion barrier off the small cavity, a distant equilibrium point, in which the metric function has a minimum, and a region of Newtonian attraction. Depending on the sign and value of the cosmological constant, the solutions are asymptotically de Sitter (dS), asymptotically flat, or asymptotically anti-de Sitter (AdS).

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